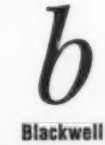
IUPAC

Pure and Applied Chemistry

Official Journal of the International Union of Pure and Applied Chemistry

Volume Contents, Author and Subject Indexes

Volume 69 1997



PURE and APPLIED CHEMISTRY

Official Journal of the
International Union of Pure and Applied Chemistry

President: A. E. FISCHLI *(Switzerland)*
Vice-President: J. JORTNER *(Israel)*
Secretary-General: E. D. BECKER *(USA)*
Treasurer: J. M. *WARD (UK)*

Dr John W. Jost, Executive Director, IUPAC Secretariat, 104 T.W. Alexander Drive, PO Box 13757, Research Triangle Park, North Carolina 27709-3757, USA
Telephone: +1 919 485 8706 Fax: +1 919 485 8700 E-mail: JohnWJost@compuserve.com
and http://chemistry.rsc.org/rsc/iupac.htm

IUPAC Committee on Printed and Electronic Publications (CPEP)
D. H. M. BOWEN *(USA): Chairman*
H. CHIHARA (Japan)
S. R. HELLER *(USA)*
R. LUCKENBACH *(Germany)*
A. D. McNAUGHT *(UK)*
R. POTENZONE *(USA)*
P. S. STEYN *(South Africa)*
WENDY A. WARR *(UK)*
Y. WOLMAN *(Israel)*
H. V. KEHIAIAN *(France)*
W. G. TOWN *(UK)*

Pure and Applied Chemistry
Editorial Advisory Board
Y. WOLMAN *(Israel): Chairman*
K. KUCHITSU *(Japan): Physical Chemistry Division*
G. J. LEIGH *(UK): Inorganic Chemistry Division*
D. St. C BLACK *(Australia): Organic Chemistry Division*
A. ABE *(Japan): Macromolecular Division*
A. HULANICKI *(Poland): Analytical Chemistry Division*
J. SLANINA *(Netherlands): Chemistry & Environment Division*
D. H. M. BOWEN *(USA): CPEP*
A. D. McNAUGHT *(UK): Interdivisional Committee on Nomenclature and Symbols*

Copyright © 1997 International Union of Pure and Applied Chemistry

Except for the section 'IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions' requests for permission to reproduce material from the Journal should be addressed to the IUPAC Secretariat

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to IUPAC if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.
The Blackwell Science logo is a trade mark of Blackwell Science Ltd registered at the United Kingdom Trade Marks Registry.

Photocopying information for Users in the USA

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by the International Union of Pure and Applied Chemistry for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of $14.00 per copy is paid directly to CCC, 222 Rosewood Drive, Suite 910, Danvers, MA 01923, USA. Special requests should be addressed to IUPAC. 0033-4545/97 $14.00.

Production Editor. Howard Waller, Blackwell Science Ltd, Osney Mead, Oxford OX2 0EL, UK. Tel.: +44 (0)1865 206120; Fax: +44 (0)1865 200918; E-mail: pac@blacksci.co.uk Information on this journal can be accessed at http://www.blackwell-science.com/products/journals/pac.htm

Annual Subscription Rate 1997. One volume, twelve issues, monthly, £672 (Europe), £736 (Rest of World), US$1020 (N. America) (including postage). Any individual whose institution takes out a library subscription may purchase a second or additional subscription for personal use at the reduced rate of US$115.00 (£82.00) *per annum.* Subscriptions are run on a calendar year basis, starting with the first issue of the year in all cases.

Microform Subscriptions and Back Issues. Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm at the end of the subscription year. All matters relating to orders and subscriptions, back issues and offprints should be sent to the Journal Subscriptions Department, Blackwell Science Ltd, PO Box 88, Oxford OX2 0EL, UK. E-mail: journals.cs@blacksci.co.uk

Advertising. Enquiries should be sent to the Advertisement Manager, Blackwell Science Ltd, Osney Mead, Oxford OX2 0EL, UK (Tel.: +44 (0)1865 206206; Fax: +44 (0)1865 721205). This journal is printed on acid-free paper.

The journal is despatched within Europe by surface mail, and to other continents by various forms of air-speeded delivery: to the USA* by air freight for forwarding by second class post, to India by air freight for guaranteed local delivery, and to all other countries by accelerated surface post.

*Periodicals postage paid at Rahway, NJ. Postmaster, send address changes to *Pure and Applied Chemistry* c/o Mercury Airfreight International Inc., 2323 EF Randolph Avenue, Avenel, NJ 07001 (US Mailing Agent).

This journal is in the ADONIS service, whereby copies of individual articles, as identified by an ADONIS number, can be printed out from CD-ROM on request. An explanatory leaflet is available from the publishers.

Contents

JANUARY

Plenary and selected Invited lectures presented at the 35th IUPAC Congress held in Istanbul, Turkey, 14–19 August 1995

Plenary Lectures

J. G. Calvert — 1 — The chemistry of the atmosphere and its perturbations through human activities

R. A. Marcus — 13 — Transfer reactions in chemistry. Theory and experiment

P. Nikolaev, A. Thess, T. Guo, D. T. Colbert and R. E. Smalley — 31 — Fullerene nanowires

Invited Lectures

I. Ölmez and M. R. Arnes — 35 — Atmospheric mercury: How much do we really know?

I. F. Al-Momani G. Güllü, I. Ölmez, Ü. Eler, E. Örtel, G. Sirin and G. Tuncel — 41 — Chemical composition of eastern Mediterranean aerosol and precipitation: Indications of long-range transport

P. S. Belton — 47 — Spectroscopic approaches to the measurement of food quality

N. W. Teitz, D. F. Shuey and D. R. Wekstein — 51 — Clinical laboratory values in the aging population

J. Brickmann — 55 — Model scenarios for the understanding of molecular recognition

H. N. Erten — 71 — Radiochronology of lake sediments

M. Froment, H. Cachet, H. Essaaidi, G. Maurin and R. Cortes — 77 — Metal chalcogenide semiconductors growth from aqueous solutions

R. D. Levine — 83 — Molecular reaction dynamics looks toward the next century: Understanding complex systems

W. Adam, H. M. Harrer, F. Kita and W. M. Nau — 91 — Localized triplet diradicals as a probe for electronic substituent effects in benzyl-type radicals: The ΔD scale

M. Balci — 97 — Synthesis of conduritols and related compounds

A. S. Demir — 105 — A novel synthesis of optically active a-amino acids

© IUPAC 1997

K.-D. Warzecha, X. Xing and M. Demuth	109	Cyclization of terpenoid polyalkenes via photo-induced electron transfer—versatile single-step syntheses of mono- and polycycles
G. Maier, H. P. Reisenauer, T. Preiss, H. Pacl, D. Jürgen, R. Tross and S. Senger	113	Highly reactive molecules: Examples for the interplay between theory and experiment
S. W. Pelletier	119	Research in the chemistry of diterpenoid alkaloids
K. Adachi and T. Kotaka	125	Dielectric normal mode relaxation of tethered polyisoprene chains in styrene-isoprene block copolymers
H. Benoît	131	On the scattering of neutrons by polymers at high scattering angles
G. Ruggeri, M. Bianchi, G. Puncioni and F. Ciardelli	143	Molecular control of electric conductivity and structural properties of polymers of pyrrole derivatives
W. L. Nachlis, J. T. Bendler, R. P. Kambour and W. J. MacKnight	151	Topological effects on blend miscibility
J. C. Kraak	157	Prospects of miniaturized separation systems
S. Süzer	163	Electron spectroscopic investigation of polymers and glasses
G. C. Allen, P. J. Heard, R. J. H. Su and J. C. C. Day	169	Ion beam excited optical spectroscopy of inorganic compounds
H. Gulce, S. S. Celebi, H. Ozyoruk and A. Yildiz	173	Electroanalysis and electrocatalysis using poly(vinylferrocenium) perchlorate coated electrodes
N. N. Greenwood	179	Recent developments concerning the discovery of elements 100–111
R. Kniep	185	Ternary and quaternary metal nitrides: A new challenge for solid state chemistry
C. Kayran, E. Okan, S. Özkar, Ö. Özturk, S. Saldamli and A. Tekkaya	193	Displacement kinetics of 1,5-cyclooctadiene from $M(CO)_4(\eta^{2:2}$-1,5-cyclooctadiene) (M = Cr, Mo, W) by bis(diphenylphosphino)alkane
C. N. R. Rao	199	Chemical design of solid inorganic materials
Y. Sasaki, K. Umakoshi, T. Imamura, A. Kikuchi and A. Kishimoto	205	Reactivity of di- and tri-nuclear complexes of heavy mid-transition elements: a case of oxo-carboxylato-bridged complexes

FEBRUARY

Physical Organic Chemistry for the 21st Century. A Symposium in Print.

C. L. Perrin	iv	Foreword
T. T. Tidwell	211	The first century of physical organic chemistry: A prologue

© 1997 IUPAC

T. T. Tidwell	215	Summary
E. M. Arnett	217	Physical organic chemistry in the 21st century: Will it be recognizable?
R. Breslow	223	What will physical organic chemistry achieve in the 21st century?
F. Cacace	227	Gas-phase ion chemistry in the 21st century
J. B. F. N. Engberts	231	Physical organic chemistry in the making
M. A. Fox	235	Beyond the traditional confines: Physical organic chemistry in the 21st century
K. N. Houk and J. K. Lee	237	Physical organic chemistry in the twenty-first century: Evanescent or transcendent?
K. U. Ungold	241	Kinetic and mechanistic studies of free radical reactions in the 21st century
A. R. Katritzky, M. Karelson and V. S. Lobanov	245	QSPR as a means of predicting and understanding chemical and physical properties in terms of structure
E. M. Kosower	249	Rethinking physical organic chemistry
M. Lahav	255	The physical organic chemist as a materials scientist in the 21st century
T. Mukaiyama	257	From a synthetic organic chemist
O. M. Nefedov and M. P. Egorov	259	Modern trends in physical organic chemistry
G. A. Olah	263	Whither physical organic chemistry or to what degree does it really exist? A personal view
J. D. Roberts	265	Where is physical organic chemistry going?
J.-M. Savéant	269	Physical organic chemistry. Electron transier chemistry. Molecular electrochemistry
D. Schröder, C. Heineman, W. Koch and H. Schwartz	273	Perspectives and challenges of physical organic chemistry
A. Streitwieser	281	Some personal views on the past and future of physical organic chemistry
J. Vogt and D. Bellus	283	Physical organic chemistry: Quo Vadis?
F. H. Westheimer	285	Physical organic chemistry
A. Yamamoto	287	Effluence of physical organic chemistry on studies of organometallic complexes

IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Atomic Weights and Isotopic Abundances (H. R. Krouse and T. B. Coplen)	293	Reporting of relative sulfur isotope-ratio data (Technical Report)

© 1997 IUPAC

Commission on Electroanalytical Chemistry (J. Mocak, A. M. Bond, S. Mitchell and G. Scollary) 297 A statistical overview of standard (IUPAC and ACS) and new procedures for determining the limits of detection and quantification: Application to voltammetric and stripping techniques (Technical Report)

Commission on Equilibrium Data (L. H. J. Lajunen, R. Portanova, J. Piispanen and M. Tolazzi) 329 Critical evaluation of stability constants for *alpha*-hydroxycarboxylic acid complexes with protons and metal ions and the accompanying enthalpy changes—Part I: Aromatic *ortho*-hydroxycarboxylic acids (Technical Report)

MARCH

Plenary, Mini-Symposium and Invited lectures presented at the 11th International Conference on Organic Synthesis, held in Amsterdam, the Netherlands, 30 June–4 July 1996

Plenary Lectures

A. G. M. Barrett, W. W. Doubleday, D. Hamprecht, K. Kasdorf and G. J. Tustin 383 Recent advances in the synthesis of antifungal agents

C. A. A. van Boeckel 389 Synthetic heparin-like antithrombotics

F. N. Diederich 395 Covalent fullerene chemistry

M. Isobe, K. Tsuboi, S. Hosokawa, M. Bamba, K. Kira, S. Shibuya, I. I. Ohtani, T. Nishikawa and Y. Ichikawa 401 Enzyme inhibitors, synthesis and approach to mechanism

A. S. Kende 407 Rearrangement strategies in natural products synthesis

K. C. Nicolaou and E. W. Yue 413 Total synthesis of selected natural products

C.-H. Wong 419 A chemo-enzymatic approach to the study carbohydrate-based biological recognitions

Mini-symposium: Synthesis directed towards complex medicinal agents

E. Keinan, A. Sinha, A. Yazbak, S. C. Sinha and S. C. Sinha 423 Towards chemical libraries of annonaceous acetogenins

J. P. Kutney 431 Plant cell culture combined with chemistry—routes to clinically important compounds

A. De Mesmaeker, A. Waldner, S. Wendeborn and R. M. Wolf 437 Backbone modifications for antisense oligonucleotides

M. Neya 441 Discovery of endothelin antagonists

J. M. Nuss, M. C. Desai, R. N. Zuckermann, R. Singh, P. A. Renhowe, D. A. Goff, J. P. Chinn, L. Wang, H. Dorr, E. G. Brown and S. Subramanian 447 Developing a general strategy for the solid supported synthesis of heterocycles: Applications to the generation of molecular diversity and drug discovery

© 1997 IUPAC

I. Shinkai 453 Design and development of practical asymmetric syntheses of drug candidates

P. Sinaÿ 459 Synthesis of oligosaccharide mimetics

J. Becher, Z.-T. Li, P. Blanchard, N. Svenstrup, J. Lau, M. B. Nielsen and P. Leriche 465 Tetrathiafulvalenes in macrocyclic and supramolecular chemistry

Invited Lectures

I. P. Beletskaya 471 Palladium catalyzed C–C and C-heteroatom bond formation reactions

D. L. Comins, S. P. Joseph, H. Hong, R. S. Al-awar, C. J. Foti, Y.-m. Zhang, X. Chen, D. H. LaMunyon and M. Guerra-Weltzien 477 Asymmetric synthesis and synthetic utility of 2,3-dihydro-4-pyridones

H.-F. Chow and C. C. Mak 483 Synthesis and chiroptical properties of layer-block dendrimers

C. J. Easton 489 Free-radical reactions for the stereoselective synthesis of amino acid derivatives

A. G. Fallis 495 From tartrate to taxoids: A double, intramolecular Diels–Alder strategy

T. Fukuyama and G. Liu 501 Stereocontrolled total synthesis of (±)-gelsemine

C. Gennari 507 Rationally designed chiral enol borinates: Powerful reagents for the stereoselective synthesis of natural products

G. Helmchen, S. Kudis, P. Sennhenn and H. Steinhagen 513 Enantioselective catalysis with complexes of asymmetric P,N-chelate ligands

P. Herczegh, I. Kovács, G. Erdösi, T. Varga, A. Agócs, L. Szilágyi, F. Sztaricskai, A. Berecibar, G. Lukacs and A. Olesker 519 Stereoselective cycloaddition reactions of carbohydrate derivatives

M. Hirama 525 Synthesis and chemistry of chromoprotein antitumor antibiotics: Nine-membered enediynes are equilibrated with p-benzyne type biradicals

A. B. Holmes, B. Bourdin, I. Collins, E. C. Davison, A. J. Rudge, T. C. Stork and J. A. Warner 531 Cycloaddition reactions for the synthesis of piperidine and indolizidine alkaloids

J. A. L. M. van Dorst, **J. P. Kamerling** and J. F. G. Vliegenthart 537 Exploring the substrate specificity of sialyltransferases

E. P. Kündig, D. Amurrio, G. Anderson, D. Beruben, K. Khan, A. Ripa and L. Ronggang 543 Chiral auxiliaries, ligands and arene chromium complexes

© 1997 IUPAC

A. M. Lobo and S. Prabhakar	547	Pericyclic reactions in the synthesis of natural products
X. Lu, G. Zhu, Z. Wang, S. Ma, J. Ji and Z. Zhang	553	Enyne cyclization methodology for the synthesis of bioactive lactones
M. Makosza	559	Synthesis of heterocyclic compounds *via* vicarious nucleophilic substitution of hydrogen
I. E. Markó, A. Mekhalfia, F. Murphy, D. J. Bayston, M. Bailey, Z. Janousek and S. Dolan	565	Multicomponent cyclisations. Efficient methodologies for the preparation of complex natural products
S. F. Martin	571	General strategies for the stereoselective synthesis of alkaloid natural products
J. de Mendoza, V. Alcázar, E. Botana, A. Galán, G. Lu, J. O. Magrans, M. Martín-Portugués, P. Prados, A. Salmerón, J. Sánchez-Quesada, C. Seel and M. Segura	577	Total synthesis of non-natural compounds for molecular recognition. The double challenge
J. P. Michael and D. Gravestock	583	Enaminones as intermediates in the synthesis of indolizidine alkaloids
S. Murai, N. Chatani and F. Kakiuchi	589	Catalytic addition of C–H bonds to multiple bonds
T. Nakai and K. Tomooka	595	Asymmetric [2,3]-Wittig rearrangement as a general tool for asymmetric synthesis
K. Narasaka	601	Generation of radical species by one electron oxidation with metallic compounds for the construction of carbon skeletons
C. Wedler, R. Ludwig and **H. Schick**	605	Application of enolates of activated carboxylic acid derivatives in organic synthesis—novel syntheses of β-lactones
Y. Thebtaranonth	609	Natural products synthesis involving anions derived from functionalized mono- and diesters
B.-J. Uang, S.-Y. Po, S.-C. Hung, H.-H. Liu, C.-Y. Hsu, Y.-S. Lin and J.-W. Chang	615	Asymmetric synthesis employing chiral ketones as templates
O. Varela	621	Aldonolactones as chiral templates in the synthesis of thiolactones, 1,3-polyols and hydroxy amino acids
B. Waegell	627	Palladium and (or) ruthenium catalyzed synthesis of natural products
S. F. Fillery, G. J. Gordon, T. Luker and **R. J. Whitby**	633	Tandem reactions on a zirconocene template
P. Wipf, W. Xu, H. Takahashi, H. Jahn and P. D. G. Coish	639	Synthetic applications of organozirconocenes

© 1997 IUPAC

B. Quiclet-Sire and S. Z. Zard 645 Riding the tiger: Using degeneracy to tame wild radical processes

B. Zwanenburg and J. W. J. F. Thuring 651 Synthesis of strigolactones and analogs: A molecular approach to the witchweed problem

APRIL

Plenary lectures presented at the International Symposium on Sweeteners, held in Jerusalem, Israel, on 14–20 July 1996

R. Ikan, B. Crammer and A. Douglas Kinghorn iv Preface

Chulabhorn Mahidol, H. Prawat and S. Ruchirawat 655 Natural products for the improvement of the quality of life

R. S. Shallenberger 659 Taste recognition chemistry

A. van der Heijden 667 Historical overview on structure–activity relationships among sweeteners

O. Tanaka 675 Improvement of taste of natural sweeteners

G. G. Birch, S. Parke, R. Siertsema and J.M. Westwell 685 Importance of molar volumes and related parameters in sweet taste chemoreception

L. Hough, T. Suami and T. Machinami 693 Manipulation and magnification of the sweetness of sucrose

S. S. Schiffman 701 Receptors that mediate sweetness: Inferences from biochemical, electrophysiological and psychophysical data

T. H. Grenby 709 Dental aspects of the use of sweeteners

M. Goodman, D. Kent, M. Zanetti, M. Gerloni, M. Kohmura and Y. Ariyoshi 715 An immunological approach to the structural basis of the sweet taste

J. E. Steiner 721 Taste-acceptance and taste-aversion reflected by behavorial manifestations in man and animals

Plenary and Invited lectures presented at the 16th IUPAC Symposium on Photochemistry, held in Helsinki, Finland, 21–26 July 1996

R. S. Davidson vi Preface

N. Mataga 729 Development of exciplex chemistry: Some fundamental aspects

W. Adam, C. van Barneveld, O. Emmert, H. M. Harrer, F. Kita, A. S. Kumar, W. Maas, W. M. Nau, S. H. K. Reddy and J. Wirz 735 About monoradicals, triplet diradicals and higher spin states: Understanding electronic substituent effects through EPR and time-resolved UV spectroscopy

F. Kulzer, R. Kettner, S. Kummer and Th. Basché 743 Single molecule spectroscopy: Spontaneous and light-induced frequency jumps

© 1997 IUPAC

M. A. El-Sayed and S. Logunov	749	On the molecular origin of the protein catalysis of the primary process in bacteriorhodopsin photosynthesis: Retinal photoisomerization
L. Peng, C. Colas and **M. Goeldner**	755	Photoregulation of cholinesterase activity
L. B.-Å. Johansson and J. Karolin	761	Electronic energy migration and rotation within bichromophoric molecules
J. M. Kelly, M. M. Feeney, L. Jacquet, A. Kirsch-De Mesmaeker and J.-P. Lecomte	767	Photoinduced electron transfer between ruthenium complexes and nucleotides or DNA
M. Klessinger	773	Theoretical models for the selectivity of organic singlet and triplet photoreactions
G. Marconi and B. Mayer	779	Conformational and circular dichroism studies on cyclodextrin inclusion complexes
J. Michl and Z. Havlas	785	Spin-orbit coupling in biradicals: Structural aspects
M. G. Neumann and M. J. Tiera	791	Photochemical determination of the interactions between surfactants and polyelectrolytes
A. Osuka, N. Mataga and T. Okada	796	A chemical approach towards the photosynthetic reaction center
M. S. Platz, H. Huang, F. Ford and J. Toscano	803	Photochemical rearrangements of diazirines and thermal rearrangements of carbenes
H. D. Roth, H. Weng, D. Zhou and T. Herbertz	809	Electron transfer photochemistry of bifunctional strained-ring and unsaturated systems
M. Leibovitch, G. Olovsson, **J. R. Scheffer** and J. Trotter	815	Absolute configuration correlation studies in solid state organic photochemistry
H. Shizuka	825	Photophysics and photochemistry of triplet exciplexes between triplet naphthalene derivatives and benzophenone
D. J. Stufkens, M. P. Aarnts, B. D. Rossenaar and A. Vlcek Jr	831	A new series of Re- and Ru-complexes having a lowest $\sigma\pi^*$ excited state that varies from reactive to stable and long lived
H. Tomioka	837	Matrix isolation study of reactive o-quinoid compounds: Generation detection and reactions
J. Troe	841	Towards a quantitative characterization photoisomerization rates
C. Wentrup, A. Reisinger, G. G. Qiao and P. Visser	847	Photochemistry of pyridyl azides and diazo ketones in matrix and in solution
F. Wilkinson	851	Quenching of electronically excited states by molecular oxygen in fluid solution

© 1997 IUPAC

Plenary lectures presented at the International Conference on Chemical Physics on the Border of 21st century held in Moscow, Russia, 16–19 April 1996

A. E. Shilov	857	N.N. Semnov and the chemistry of 20th century (to 100th anniversary of his birth)
K. I. Zamaraev	865	Chemical physics and catalysis
V. I. Goldanskii	877	Non-traditional pathways of solid-phase astrochemical reactions
V. E. Fortov and I. V. Lomonosov	893	Thermodynamics of extreme states of matter

MAY

Plenary and Specially Invited Lectures presented at the 7th International Symposium on Solubility Phenomena, held in Leoben, Austria, 22–25 July 1996

H. Gamsjager	iv	Preface
R. E. Mesmer, D. A. Palmer, J. M. Simonson, H. F. Holmes, P. C. Ho, D. J. Wesolowski and M. S. Gruszkiewicz,	905	Experimental studies in high temperature aqueous chemistry at Oak Ridge National Laboratory
F. Franks	915	Phase changes and chemical reactions in solid aqueous solutions: Science and technology
K. Sawada	921	The mechanisms of crystallization and transformation of calcium carbonates
B. A. Wolf	929	Improvement of polymer solubility: influence of shear and of pressure
J. P. Amend and H. C. Helgeson	935	Solubilities of the common L-α-amino acids as a function of temperature and solution pH
A. Skrzecz	943	Solubility data in physicochemical data collections and data banks
I. Grenthe and A. Plyasunov,	951	On the use of semiempirical electrolyte theories for modeling of solution chemical data
C. E. Kolb, J. T. Jayne, P. Davidovits and D. R. Worsnop	959	Solubility data requirements and new experimental methods in atmospheric aerosol research
A. D. Pelton	969	Thermodynamic databases and equilibrium calculations in metallurgical processes

IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Photochemistry (R. Bonneau, J. Wirz and A. D. Zuberbuhler)	979	Methods for the analysis of transient absorbance data (Technical Report)

© 1997 IUPAC

Commission on Polymer Characterization and Properties (K. Lederer and I. Mingozzi)	993	Molecular characterization of commercial polypropylene with narrow and broad distribution of molar mass (Technical Report)
Commission on Electroanalytical Chemistry (P. R. Mussini, T. Mussini and S. Rondinini)	1007	Reference value standards and primary standards for pH measurements in D_2O and aqueous–organic solvent mixtures: New accessions and assessments (Technical Report)
Commission on Nomenclature, Properties and Units and International Federation of Clinical Chemistry (D. Kenny and H. Olesen)	1015	Properties and units in the clinical laboratory sciences—II. Kinds-of-property (IUPAC Recommendations 1997)
Commission on Nomenclature, Properties and Units and International Federation of Clinical Chemistry (M. Blombäck, R. Dybkær, K. Jørgensen, H. Olesen and S. Thorsen)	1043	Properties and units in the clinical laboratory sciences—V. Properties and units in thrombosis and haemostasis (Technical Report)
Commission on Nomenclature, Properties and Units and International Federation of Clinical Chemistry (H. Olesen, D. Cowan, I. Bruunshuus, K. Klempel and G. Hill)	1081	Properties and units in the clinical laboratory sciences—VI. Properties and units in IOC prohibited drugs (Technical Report)
Chemistry and Human Health Division (H. van de Waterbeemd, R. E. Carter, G. Grassy, H. Kubinyi, Y. C. Martin, M. S. Tute and P. Willett)	1137	Glossary of terms used in computational drug design (IUPAC Recommendations 1997)
Commission on Polymer Characterization and Properties and Working Party on Structure and Properties of Commercial Polymers (D. R. Moore and J. C. Seferis)	1153	Intrinsic characterization of continuous carbon fibre thermoplastic composites—3. Fatigue crack growth (Technical Report)

JUNE

Invited lectures presented at EXCON'96, the Second International Conference on Excitonic Processes in Condensed Matter, held in Kurort Gohrisch, Saxonia, Federal Republic of Germany, 14–17 August 1996

M. Schreiber	iv	Preface
R. S. Knox	1163	Excitons and their equilibration
Y. Toyozawa	1171	Dynamics and instabilities of an exciton in the phonon field and the correlated absorption–emission spectra

© 1997 IUPAC

R. Zimmermann, F. Große and E. Runge	1179	Excitons in semiconductor nanostructures with disorder
G. C. La Rocca and E. A. de Andrada e Silva	1187	Spin splittings in nanostructures without inversion symmetry
V. Hizhnyakov and D. Nevedrov	1195	Hawking process in solids: Quantum generation of phonon bursts by a strongly excited mode
V. M. Agranovich, G. C. La Rocca, F. Bassani and **P. Reineker**	1203	Nonlinear phenomena in organic multilayers
R. van Grondelle, R. Monshouwer and L. Valkunas	1211	Photosynthetic light-harvesting
I. Fugol	1219	Relaxation processes and self-trapping of excitons in rare gas solids
K. Kan'no, T. Matsumoto and Y. Kayanuma	1227	Parity-broken and -unbroken self-trapped excitons in alkali halides

IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Thermodynamics (U. K. Deiters and K. M. de Reuck)	1237	Guidelines for publication of equations of state—I. Pure fluids (Technical Report)
Working Party on IUPAC Glossary of Terms Used in Bioinorganic Chemistry (M. W. G. de Bolster)	1251	Glossary of terms used in bioinorganic chemistry (IUPAC Recommendations 1997)
Commission on High Temperature Materials and Solid State Chemistry (G. Schwier, I. Teusel and M. H. Lewis)	1305	Characterization of SiC powders and the influence of powder properties on sintering (Technical Report)
Commission on Electroanalytical Chemistry (R. A. Durst)	1317	Chemically modified electrodes: Recommended terminology and definitions (IUPAC Recommendations 1997)
Commission on Electroanalytical Chemistry (M. Filomena Camoes, M. J. Guiomar Lito, M. I. A. Ferra and A. K. Covington)	1325	Consistency of pH standard values with the corresponding thermodynamic acid dissociation constants (Technical Report)
Commission on Agrochemicals and the Environment (N. Kurihara, J. Miyamoto, G. D. Paulson, B. Zeeh, M. W. Skidmore, R. M. Hollingworth and H. A. Kuiper)	1335	Pesticides Report 37. Chirality in synthetic agrochemicals: Bioactivity and safety consideration (Technical Report)
Commission on Agrochemicals and the Environment (K. D. Racke, M. W. Skidmore, D. J. Hamilton, J. B. Unsworth, J. Miyamoto and S. Z. Cohen)	1349	Pesticides Report 38. Pesticide fate in tropical soils (Technical Report)

© 1997 IUPAC

Commission on Agrochemicals and the Environment (D. J. Hamilton, P. T. Holland, B. Ohlin, W. J. Murray, A. Ambrus, G. C. de Baptista and J. Kovacicova) 1373 Pesticides Report 39. Optimum use of available residue data in the estimation of dietary intake of pesticides (Technical Report)

JULY

IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Nomenclature of Organic Chemistry (E. W. Godly and R. Taylor) 1411 Nomenclature and terminology of fullerenes: A preliminary study

Commission on Spectrochemical and other Optical Procedures for Analysis (T. Vo-Dinh, N. H. Velthorst, D. S. Moore and B. Schrader) 1435 Nomenclature, symbols, units, and their usage in spectrochemical analysis—XVI. Laser-based molecular spectrometry for chemical analysis—Luminescence (IUPAC Recommendations 1997)

Commission on Spectrochemical and other Optical Procedures for Analysis (B. Schrader and D. S. Moore) 1451 Nomenclature, symbols, units, and their usage in spectrochemical analysis—XVIII. Laser-based molecular spectrometry for chemical analysis—Raman scattering processes (IUPAC Recommendations 1997)

Commission on Separation Methods in Analytical Chemistry (V. A. Davankov) 1469 Analytical chiral separation methods (IUPAC Recommendations 1997)

Commission on Separation Methods in Analytical Chemistry (R. M. Smith and A. Marton) 1475 Classification and characterization of stationary phases for liquid chromatography: Part I. Descriptive terminology (IUPAC Recommendations 1997)

Commission on Separation Methods in Analytical Chemistry (A. Marton) 1481 Classification and characterization of stationary phases for liquid chromatography: Part II. Characterization of ion exchange chromatographic stationary phases (IUPAC Recommendations 1997)

Commission on Equilibrium Data (A. Bahta, G. A. Parker and D. G. Tuck) 1489 Critical survey of stability constants of complexes of thiocyanate ion (Technical Report)

Commission on Equilibrium Data (S. Sjöberg) 1549 Critical evaluation of stability constants of metal–imidazole and metal–histamine systems (Technical Report)

Commission on Soil and Water Chemistry (W. Kördel, M. Dassenakis, J. Lintelmann and S. Padberg) 1571 The importance of natural organic material for environmental processes in waters and soils (Technical Report)

Commission on Toxicology (O. M. Poulson, E. Holst and J. M. Christensen) 1601 Calculation and application of coverage intervals for biological reference values (Technical Report)

© 1997 IUPAC

AUGUST

IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Biotechnology (K. Faber)	1613	Biotransformation of non-natural compounds: State of the art and future development
Commission on Molecular Structure and Spectroscopy (C. J. H. Schutte, J. E. Bertie, P. R. Bunker, J. T. Hougen, I. M. Mills, J. K. G. Watson and B. P. Winnewisser)	1633	Notations and conventions in molecular spectroscopy: Part 1. General spectroscopic notation (IUPAC Recommendations 1997)
Commission on Molecular Structure and Spectroscopy (C. J. H. Schutte, J. E. Bertie, P. R. Bunker, J. T. Hougen, I. M. Mills, J. K. G. Watson and B. P. Winnewisser)	1641	Notations and conventions in molecular spectroscopy: Part 2. Symmetry notation (IUPAC Recommendations 1997)
Commission on Molecular Structure and Spectroscopy (P. R. Bunker, C. J. H. Schutte, J. T. Hougen, I. M. Mills, J. K. G. Watson and B. P. Winnewisser)	1651	Notations and conventions in molecular spectroscopy: Part 3. Permutation and permutation-inversion symmetry notation (IUPAC Recommendations 1997)
Commission on Nomenclature of Inorganic Chemistry (E. O. Fluck and R. S. Laitinen)	1659	Nomenclature of inorganic chains and ring compounds (IUPAC Recommendations 1997)
Working Party on Structure and Properties of Commercial Polymers (A. Cervenka and P. S. Allan)	1693	Characterization of finite length composites: Part I. Introductory paper (Technical Report)
Working Party on Structure and Properties of Commercial Polymers (L. Glas, P. S. Allen, T. Vu-Khanh and A. Cervenka)	1707	Characterization of finite length composites: Part II. Mechanical performance of injection moulded composites (Technical Report)
Working Party on Structure and Properties of Commercial Polymers (A. Cervenka and P. S. Allan)	1725	Characterization of finite length composites: Part III. Studies on thin sections extracted from mouldings (wafers) (Technical Report)
Working Party on Structure and Properties of Commercial Polymers (P. S. Allan, A. Cervenka and D. R. Moore)	1741	Characterization of finite length composites: Part V. Modelling of stiffness (Technical Report)
Commission on Radiochemistry and Nuclear Techniques (E. Roth)	1753	Critical evaluation of the use and analysis of stable isotopes (Technical Report)
Commission on Oils, Fats and Derivatives (A. Dieffenbacher and P. Dysseler)	1829	Determination of *trans* unsaturated fatty acids in edible oils and fats by capillary gas–liquid chromatography (Technical Report)

© 1997 IUPAC

SEPTEMBER

Plenary lectures presented at the 18th International Carbohydrate Symposium held in Milan, Italy, 21–26 July 1996

M. Petitou and **C. A. A. van Boeckel** (Whistler award lecture)	1839	Heparin: from the original "soup" to well-designed heparin mimetics
K. Ekelöf, **P. J. Garegg**, L. Olsson and S. Oscarson	1847	Towards the 21st century—the emerging importance of oligosaccharide synthesis
F. W. Lichtenthaler and S. Mondel	1853	Perspectives in the use of low molecular weight carbohydrates as organic raw materials
R. A. Laine	1867	Information capacity of the carbohydrate code
J. F. G. Vliegenthart	1875	Structural glycobiology: How to gain insight into the structure–function relationship
H. C. Kolb and **B. Ernst**	1879	Recent progresses in the glycodrug area
D. A. Brant	1885	Shapes and motions of polysaccharide chains
Y. Nagai	1893	A challenge to the riddle of the carbohydrate chain
U. Lindahl	1897	Heparan sulfate—a polyanion with multiple messages
T. Tai, I. Kawashima, H. Ozawa, M. Kotani and K. Ogura	1903	Cell-type specific expression of gangliosides in the central nervous system
I. W. Sutherland	1911	Microbial exopolysaccharides—structural subtleties and their consequences

Special and plenary lectures presented at the 13th International Conference on Physical Organic Chemistry held in Inchon, Korea, 26–29 August 1996

B. R. Cho	vi	Preface
G. S. Hammond	1919	Physical organic chemistry after 50 years: It has changed, but is it still there?
M.-F. Ruasse, I. B. Blagoeva, R. Ciri, L. Garcia-Rio, J. R. Leis, A. Marques, J. Mejuto and E. Monnier	1923	Organic reactions in micro-organized media: Why and how?
Z. Rappoport, J. Frey, M. Sigalov and E. Rochlin	1933	Recent advances in the chemistry of stable simple enols
D. H. R. Barton and B. Hu	1941	The selective functionalization of saturated hydrocarbons: Recent developments in Gif chemistry

© 1997 IUPAC

Y. Sakata, H. Imahori, H. Tsue, S. Higashida, T. Akiyama, E. Yoshizawa, M. Aoki, K. Yamada, K. Hagiwara, S. Taniguchi and T. Okada	1951	Control of electron transfer and its utilization
R. Kluger	1957	Lessons from thiamin-watching
D. A. Dougherty	1969	Physical organic chemistry in the brain
D. H. Cao, K. Chen, J. Fan, J. Manna, B. Olenyuk, J. A. Whiteford and P. J. Stang	1979	Supramolecular chemistry and molecular design: Self assembly of molecular squares
F. M. Raymo and J. F. Stoddart	1987	Slippage—a simple and efficient way to self--assemble [n]rotaxanes
T. Kunitake	1999	Specific recognition and two-dimensional organization of molecules at the air–water interface

Erratum: IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Agrochemicals and the Environment (N. Kurihara, J. Miyamoto, G. D. Paulson, B. Zeeh, M. W. Skidmore, R. M. Hollingworth and H. A. Kuiper)	2007	Pesticides Report 37: Chirality in synthetic agrochemicals: Bioactivity and safety consideration (Technical Report)

OCTOBER

Main lectures presented at the 11th International Symposium on Carotenoids held in Leiden, the Netherlands, 18–23 August 1996

G. Britton	iv	Preface
S. Liaaen-Jensen	2027	Stereochemical aspects of carotenoids
R. K. Müller, K. Bernhard, A. Giger, G. Moine and U. Hengartner	2039	(*E*/*Z*)-Isomeric carotenes
H. Pfander, B. Traber and M. Lanz	2047	Carotenoid synthesis: A progress report
R. B. van Breemen	2061	Liquid chromatography/mass spectrometry of carotenoids
J. S. Sinninghe Damsté and M. P. Koopmans	2067	The fate of carotenoids in sediments: An overview
G. Britton, R. J. Weesie, D. Askin, J. D. Warburton, L. Gallardo-Guerrero, F. J. Jansen, H. J. M. de Groot, J. Lugtenburg, J.-P. Cornard and J.-C. Merlin	2075	Carotenoid blues: structural studies on carotenoproteins

© 1997 IUPAC

R. J. Weesie, R. Verel, F. J. H. M. Jansen, G. Britton, J. Lugtenburg and **H. J. M. de Groot**	2085	The mechanism of the colour shift of astaxanthin in α-crustacyanin as investigated by ^{13}C MAS NMR and specific isotope enrichment
W. J. de Grip, F. de Lange, P. Bovee, P. J. E. Verdegem and J. Lugtenburg	2091	Photo-excitation by a half-carotenoid: symbiosis between retinal and the visual protein opsin
D. P. Aalberts, F. L. J. Vos and W. van Saarloos	2099	Towards understanding the ultra-fast dynamics of rhodopsin
A. Bifone, H. J. M. de Groot and F. Buda	2105	*Ab initio* molecular dynamics of rhodopsin
A. L. Moore, T. A. Moore, D. Gust, J. J. Silber, L. Sereno, F. Fungo, L. Otero, G. Steinberg-Yfrach, P. A. Liddell, S.-C. Hung, H. Imahori, S. Cardoso, D. Tatman and A. N. Macpherson	2111	Model systems for observing photoredox reactions of carotenoids
H. A. Frank, V. Chynwat, R. Z. B. Desamero, R. Farhoosh, J. Erickson and J. Bautista	2117	On the photophysics and photochemical properties of carotenoids and their role as light-harvesting pigments in photosynthesis
A. J. Young, D. Phillip, A. V. Ruban, P. Horton and H. A. Frank	2125	The xanthophyll cycle and carotenoid-mediated dissipation of excess excitation energy in photosynthesis
R. B. Ramanauskaite, I. G. M. J. Segers-Nolten, K. J. de Grauw, N. M. Sijtsema, L. van der Maas, J. Greve, C. Otto and C. G. Figdor	2131	Carotenoid levels in human lymphocytes, measured by Raman microspectroscopy
T. J. King, F. Khachik, H. Bortkiewicz, L. H. Fukushima, S. Morioka and **J. S. Bertram**	2135	Metabolites of dietary carotenoids as potential cancer preventive agents
C. H. Hennekens	2141	Current knowledge and future directions for research on antioxidant vitamins in prevention of cancer, cardiovascular and eye diseases
J. J. M. Castenmiller and **C. E. West**	2145	Bioavailability of carotenoids
J. Hirschberg, M. Cohen, M. Harker, T. Lotan, V. Mann and I. Pecker	2151	Molecular genetics of the carotenoid biosynthesis pathway in plants and algae
P. M. Bramley	2159	The regulation and genetic manipulation of carotenoid biosynthesis in tomato fruit
G. Sandmann	2163	High level expression of carotenogenic genes for enzyme purification and biochemical characterization

© 1997 IUPAC

R. L. Ausich 2169 Commercial opportunities for carotenoid production by biotechnology

Plenary Lectures presented at the 31st International Conference on Coordination Chemistry, held in Vancouver, Canada on 18–23 August 1996

M. Ge, A. A. Gewirth, **W. G. Klemperer** and C. G. Wall 2175 A structural model for silicotungstate (α-$SiW_{12}O_{40}^{4-}$) monolayers on silver (111)

L. F. Lindoy 2179 Tailoring macrocycles for metal ion binding

E. Kimura, T. Ikeda and M. Shionoya 2187 Macrocyclic metal complexes for selective recognition of nucleic acid bases and manipulation of gene expression

R. R. Schrock 2197 High oxidation state coordination chemistry with triamidoamine tungsten and molybdenum complexes

C. D. Garner, P. Baugh, D. Collison, E. S. Davies, A. Dinsmore, J. A. Joule, E. Pidcock and C. Wilson 2205 X-ray absorption spectroscopic studies of metal centres in biology and developments of relevant synthetic analogues

B. R. James 2213 Coordination chemistry, and catalytic conversions, of H_2S

NOVEMBER

Plenary and Invited Lectures presented at the 14th International Conference on Chemical Thermodynamics, held in Toyonaka, Osaka, Japan, 25–30 August 1996

T. Matsuo iv Preface

R. A. Alberty 2221 Legendre transforms in chemical thermodynamics

J.-P. E. Grolier 2231 From simple fluids to polymers, recent developments of calorimetric techniques and their contribution to thermodynamics

A. Ben-Naim 2239 Solvation and solubility of globular proteins

A. D. Pelton 2245 Thermodynamic modeling and phase equilibrium calculations in nuclear materials

E. Freire 2253 Thermodynamics of protein folding and molecular recognition

Y. Takahashi 2263 High-temperature heat-capacity measurement up to 1500 K by the triple-cell DSC

V. M. Valyashko 2271 Phase behavior in binary and ternary water–salt systems at high temperatures and pressures

L. Zhang, **Z.-C. Tan** and M. Wu 2281 Calorimetric study of a new inclusion complex $ZnS_{23.4}$·β-cyclodextrin·$6H_2O$

© 1997 IUPAC

J. E. Callanan, **R. D. Weir** and E. F. Westrum, Jr	2289	Transition metal silicides and tellurides: Crystal structure, heat capacities, and derived thermodynamic properties from absolute zero to 2200 K
M. A. V. Ribeiro da Silva and M. A. R. Matos	2295	Recent work on the thermochemistry of some nitrogen heterocycles
G. Barone, F. Catanzano, P. del Vecchio, C. Giancola and G. Graziano	2307	Thermodynamics of protein stability: A family of ribonucleases
T. Ozawa	2315	Temperature modulated differential scanning calorimetry—applicability and limitation
I.-K. Moon and Y.-H. Jeong	2321	Dynamic heat capacity and enthalpy relaxation of a supercooled liquid $[Ca(NO_3)_2]_{0.4}[KNO_3]_{0.6}$
G. T.-K. Fey and C.-S. Wu	2329	Dopant effects and conductivity studies on a new high voltage cathode material with inverse spinel structure
M. Schütze, M. Hald, C. Lang, S. Melsheimer and A. Rahmel	2335	Intermetallic disilicides and titanium aluminides—a new class of structural high temperature materials under the aspect of their high temperature oxidation resistance

International Conference on Environmental Biotechnology, Palmerston North, New Zealand, 1–4 September 1996

G. J. Manderson and R. Bhamidimarri	vi	Preface
Environmental Biotechnology, Organising Committee (J. Anderson, R. Bhamidimarri, **G. J. Manderson**, P. O'Donnell, M. Donkin, J. Dickson and G. Withers)	vii	Presidential Address
G. Hamer	2343	Microbial consortia for multiple pollutant biodegradation
J. Káš, J. Burkhard, K. Denmerová, J. Košťál, T. Macek, M. Macková and J. Pazlarová	2357	Perspectives in biodegradation of alkanes and PCBs
A. L. Oliver, F. A. Roddick and **B. N. Anderson**	2371	Cleaner production of phenylacetylcarbinol by yeast through productivity improvements and waste minimiaation
D. M. Nobbs, J. P. Barford, B. I. Carroll and G. M. Peters	2387	An integrated investigation of anthropogenic selenium contamination in Lake Macquarie, NSW
J. Luo and A. van Oostrom	2403	Biofilters for controlling animal rendering odour—a pilot-scale study

© 1997 IUPAC

H. J. Campbell and **M. A. Connor**	2411	Practical experience with an industrial biofilter treating solvent vapour loads of varying magnitude and composition
H. H. P. Fang	2425	Inhibition of bioactivity of UASB biogranules by electroplating metals
Z. I. Bhatti, K. Furukawa and M. Fujita	2431	Microbial diversity in UASB reactors
P. Prasertsan, M. Jaturapornpipat and C. Siripatana	2439	Utilization and treatment of tuna condensate by photosynthetic bacteria
J. E. Schmidt and B. K. Ahring	2447	Treatment of waste water from a multi-product food processing company in upflow anaerobic sludge blanket (UASB) reactors: The effect of seasonal variation
T. Tsuchida and F. Yoshinaga	2453	Production of bacterial cellulose by agitation culture systems
L. M. Freitas dos Santos, P. Pavasant, L. F. Strachan, E. N. Pisikopoulos and **A. G. Livingston**	2459	Membrane attached biofilms for waste treatment—fundamentals and applications

DECEMBER

IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions

Commission on Nomenclature of Inorganic Chemistry	2471	Names and symbols of transfermium elements (IUPAC Recommendations 1997)
Joint Commission on Biochemical Nomenclature (M. A. Chester)	2475	Nomenclature of Glycolipids (IUPAC Recommendations 1997)
Commission on Molecular Structure and Spectroscopy (R. K. Harris, J. Kowalewski and S. Cabral de Menezes)	2489	Parameters and symbols for use in nuclear magnetic resonance (IUPAC Recommendations 1997)
Commission on Physical Organic Chemistry (J. Shorter)	2497	Compilation and critical evaluation of structure–reactivity parameters and equations: Part 2. Extension of the Hammett σ scale through data for the ionization of substituted benzoic acids in aqueous solvents at 25 °C (Technical Report)
Commission on Macromolecular Nomenclature (J. Kahovec, P. Kratochvíl, A. D. Jenkins, I. Mita, I. M. Papisov, L. H. Sperling and R. F. T. Stepto)	2511	Source-based nomenclature for non-linear macromolecules and macromolecular assemblies (IUPAC Recommendations 1997)

© 1997 IUPAC

Commission on Polymer Characterisation and Properties (G. J. von Bradsky, R. S. Bailey, A. J. Cervenka, H. G. Zachmann and P. S. Allan)	2523	Characterization of finite length composites: Part IV—Structural studies on injection moulded composites (Technical Report)
Commission on Polymer Characterisation and Properties (R. S. Bailey and D. J. Groves)	2541	Characterization of finite length composites: Part VI—Rheological studies of materials based on the polypropylene matrix (Technical Report)
Commission on Polymer Characterization and Properties of Commercial Polymers (M. Mochizuki, K. Nakayama, R. Qian, B.-Z. Jiang, M. Hirami, T. Hayashi, T. Masuda and A. Nakajima)	2567	Studies on the biodegradable poly(hexano-6-lactone) fibers 1. Structure and properties of drawn poly(hexano-6-lactone) fibers (Technical Report)
Commission on Nomenclature, Properties and Units (I. Bruunshuus, W. Frederiksen, H. Olesen and I. Ibsen)	2577	Properties and units in the clinical laboratory sciences: Part III. Elements (of properties) and their code values (Technical Report)
Commission on Nomenclature, Properties and Units (H. Olesen, D. Kenny, I. Bruunshuus, I. Ibsen, K. Jorgensen, R. Dybkær, X. Fuentes-Arderiu, G. Hill, P. Soares de Araujo and C. McDonald)	2583	Properties and units in the clinical laboratory sciences: Part IV. Properties and their code values (Technical Report)
Commission on Nomenclature, Properties and Units (R. Cornelis, X. Fuentes-Arderiu, I. Bruunshuus and D. Templeton)	2593	Properties and units in the clinical laboratory sciences: Part IX. Properties and units in trace elements (Technical Report)
Commission on Nomenclature, Properties and Units (H. Olesen, D. Kenny, R. Dybkær, I. Ibsen, I. Bruunshuus, X. Fuentes-Arderiu, G. Hill, P. Soares de Araujo and C. McDonald)	2607	Properties and units in the clinical laboratory sciences: Part XI. Coding systems—structure and guidelines (Technical Report)
Commission on Nomenclature, Properties and Units (H. Olesen, A. Giewercman, D. M. de Kretser, D. Mortimer, H. Oshima and P. Troen)	2621	Properties and units in the clinical laboratory sciences: Part XIII. Properties and units in reproduction and fertility (Technical Report)
	I	Index to Contents of Volume 69
	xxiii	Author Index
	xxvii	Subject Index

© 1997 IUPAC